traffic counting

NEW JERSEY
DEPARTMENT OF
TRANSPORTATION

bureau of
public information

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HIGHWAY PLANNING

An "educated guess" is no basis for spending millions of dollars on widening an old route or constructing a new one. Evaluation of traffic trends from year to year is essential in highway planning. The Department must have positive proof of such needs.

COUNTING METHODS

An important tool in determining those needs is the traffic counter, a device that records the number of vehicles that pass a specific point. The Department has 200 counting locations throughout the State. Thirty-five of these are fixed stations where vehicles are counted every day, year after year, in order that definite long time traffic trends can be determined. The remaining 165 counting locations vary according to need. Some of these are counted one week every four weeks and others one week every eight weeks. All 200 locations were established to study seasonal trends and to produce factors for expanding short time counts of eight hour and twenty-four hour duration to an annual average daily total.

COUNTING LOCATIONS

All sites were carefully chosen as representative of various types of traffic on resort, residential, industrial, business, interstate, farm to market and commuter type roads. They are located at river crossings, near interchanges, on urban and rural state highways, as well as important

secondary roads and city streets. They produce samples of traffic and measure the public's everyday travel habits. These habits produce patterns that are important in designing new roads or improving existing routes.

HOW IT WORKS

The traffic counter most widely used by the Department is easily recognized by an air-filled rubber tube positioned across the highway and attached to a black metal box-like structure at the roadside. The counter is actuated when vehicle wheels pass over the tubing. The air pressure forced from the tube triggers the counting mechanism which records the vehicle as it passes over. If you were real close to the counter you might hear the metallic click as a vehicle is recorded on tape. The counter will also total the volume of traffic at 15 minute intervals, prints the hourly total and then instantaneously reset to zero. Or it can be set to record totals at one hour periods only. Its operation can be seven days a week, 24 hours a day.

HISTORY

Before 1939 all traffic counts were made manually. This was time consuming, required the use of a great deal of manpower and was subject to human error. The first mechanical counters were powered by dry cell batteries similar to those used in battery lanterns. The rubber tubing

(still in use today) was placed across highway lanes. Never more than two lanes in one direction were covered by a tube. If the tube was more than 50 feet the signal sent to the detector would be too weak to record. In 1947, a more durable machine was put into use. This machine operated with a wet cell battery similar to that now used in motor vehicles. The advantage of this machine was longer use in operation without service. At about the same time the Department began to use counters that were operated by regular electrical power. These machines combined advantages and disadvantages. They could operate longer without service but at the same time electrical power had to be supplied. This, in certain locations, was a costly operation. For that reason electrically operated machines are used only where power is readily accessible or when the machine will be in use for a long period of time at a permanent or trend station.

NEW COUNTING METHODS

The Department, ever in search of improved methods of traffic counting, acquired a Sonic Detector in 1960. This device consists of sending and receiving sound stations. Placed on a highway overpass or sign bridge the sending station is adjusted to send sound waves to the pavement below and return them to the receiving station. The receiver is so regulated that it will only actuate a counting device when the sound hits an object above the pavement level and bounces back. It has been the Department's

experience that the Sonic Detector is expensive to install, cannot be used in many desired locations without construction of a bridge similar to a sign bridge and that cars with curved roofs tend to bounce the signal into the yonder rather than back to the receiving station. For these reasons only one has been put into use for experimental purposes.

The new multilane highways also created the need for new counting methods. First, the rubber tubing is not effective over a width of more than 50 feet. Also, on multilane routes the chance of two or more vehicles hitting the tubing simultaneously multiply the margin of error in the traffic count. And on any route snow plows can play havoc by ripping up the tubing.

The answer to this has been the installation of an electronic detector. This device is called a Loop Vehicle Detector. The installation requires that a rectangular cut be made in each highway lane, an ordinary 14 gauge wire (the wire is actually wound around the cut in several turns) is embedded approximately 1½ inches deep and sealed to the pavement height. The actuator operates on what is called a balanced electrical circuit. When a vehicle passes over the embedded wire the circuit becomes unbalanced. This actuates the counter. In a matter of a hundredth of a second it is again in balance and ready to record further traffic. To count multiple lane traffic, a separate counter can be attached to the wire embedded in each lane. The Department is making use of this system not only to accurately count

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traffic on multilane routes but in one instance for testing the wearing capacities in various type pavements on an interstate route. It is expected that more of the loop system counters will be installed as the number of lanes on much of the State Highway System is steadily being increased.

USES

The data is compiled each year as an atlas map to show the average daily volume at points on the Highway System and principal secondary routes. A more compact wall type map is also prepared for public use. In addition the Department issues a monthly report on data compiled from the 35 trend stations. This report also shows the volumes for the preceding years noting the percentage of increase or decrease for the month.

The value of the information supplied by these reports can hardly be overestimated. From it the Department can determine whether an old route is carrying traffic within its designed capacity or above, whether its capacity should be increased, or if nearby parallel route should be planned. The traffic count pinpoints where the need is most urgent and thus helps determine the precedence of project locations on each route. And there is much more usable information it provides. Department engineers, by knowing when traffic is heaviest and in what direction, can determine when construction is planned on an old route, how many lanes should be left open and in what direction at a given time when work is underway. This knowledge, gained by hourly,

weekly and seasonal traffic flow counts, has also permitted the Department to specify as a part of agreements with its contractors specific times when work can be done in order to minimize inconvenience to motorists.

ECONOMIC VALUE

The information available from traffic counts is also used extensively by many businesses, county and municipal planners. The basic use remains, however, for future highway planning.

COMPUTER PROGRAM

To more speedily put to use the information gathered by traffic counters, the Department has developed a program of computation and analysis through the use of computers.

MANUAL COUNTS & SURVEYS

Still the Department needs more information than the automatic traffic counters, to date, have been able to provide. The traffic counter with the tubing counts pairs of axles, thus a three or four axle vehicle unbalances the count. The sonic or loop detectors count traffic but cannot differentiate between cars or trucks. None can tell us from where the traffic comes, where it is bound. So until the time comes when the counter can give us this added information the Department will still be bound to manual

counts for cars and trucks and origin and destination surveys for both are important in highway planning. Because this type of information is gathered only when it is essential, please be indulgent if it should, on some occasion delay you.

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